

# Missing or Dark Mass and Missing or Dark Energy are found in the components of a Multi-Vacuum Universe

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## **ABSTRACT:**

It is shown that the sum of the energies of the various states of the vacuum in a [multi-vacuum universe](#) is equivalent to the energy of the observable and predicted missing mass of the universe. The various states of the vacuum are defined and illustrated. These three components of the vacuum are the reservoirs of missing mass, dark energy, and the observable universe. All these add up to the total energy available for the evolution of the universe. In this way all of the mass and energy of the universe can be accounted for resulting in an explanatory paradigm effective for cosmological inquiries. If you are looking for the missing mass and energy locally, look no further than your body which is 99.9999999% “empty space” which is the vacuum and its components described here.

## **INTRODUCTION:**

It has been hypothesized that the vacuum of the universe is where the astronomically observable missing mass and invisible dark energy resides. The total energy of the vacuum is therefore computed using the total energy equivalent of the total missing mass in conjunction with the observable matter [see figures 1,2, and 3 below].

The fundamental energy equations of the multi-vacuum [see figure 2 top illustration] are listed below.

$$\Delta E_{\text{observable mass}} = \Delta E_{\text{I,II}} = m_{\text{observable mass}} c^2 \quad [\text{Equation 1}]$$

$$\Delta E_{\text{missing mass}} = \Delta E_{\text{II,III}} = m_{\text{missing mass}} c^2 \quad [\text{Equation 2}]$$

$$\Delta E_{\text{missing energy}} = \Delta E_{\text{0,III}} = m_{\text{missing energy}} c^2 \quad [\text{Equation 3}]$$

At any point [x,y,z] in space the total energy is given by:

$$E[x,y,z]_{\text{universe}} = \Delta E_{\text{I,II}} + \Delta E_{\text{II,III}} + \Delta E_{\text{0,III}} \quad [\text{Equation 4}]$$

**The total energy for the universe is a sum of the total energies [or mass equivalents] of the various vacuum components over all space:**

$$\begin{aligned} \text{Total } E[x,y,z]_{\text{universe}} &= \text{Total } \Delta E_{\text{I,II}} + \text{Total } \Delta E_{\text{II,III}} + \text{Total } \Delta E_{\text{0,III}} \\ &= \text{Total } \Delta E_{\text{observable mass}} + \text{Total } \Delta E_{\text{missing mass}} + \text{Total } \Delta E_{\text{missing energy}} \end{aligned} \quad [\text{Equation 5}]$$

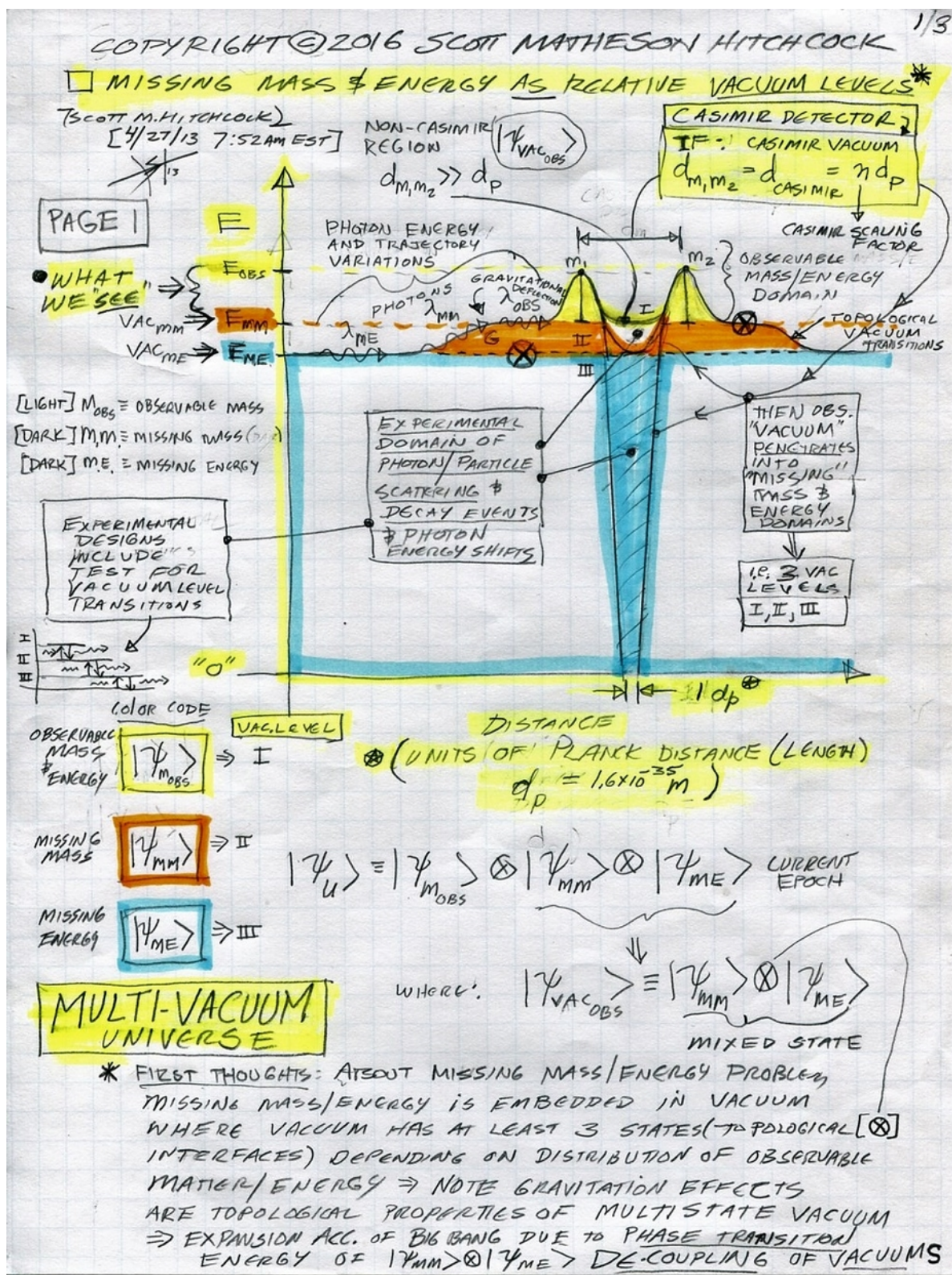


FIGURE 1



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## EVOLUTION OF VACUUM STATES

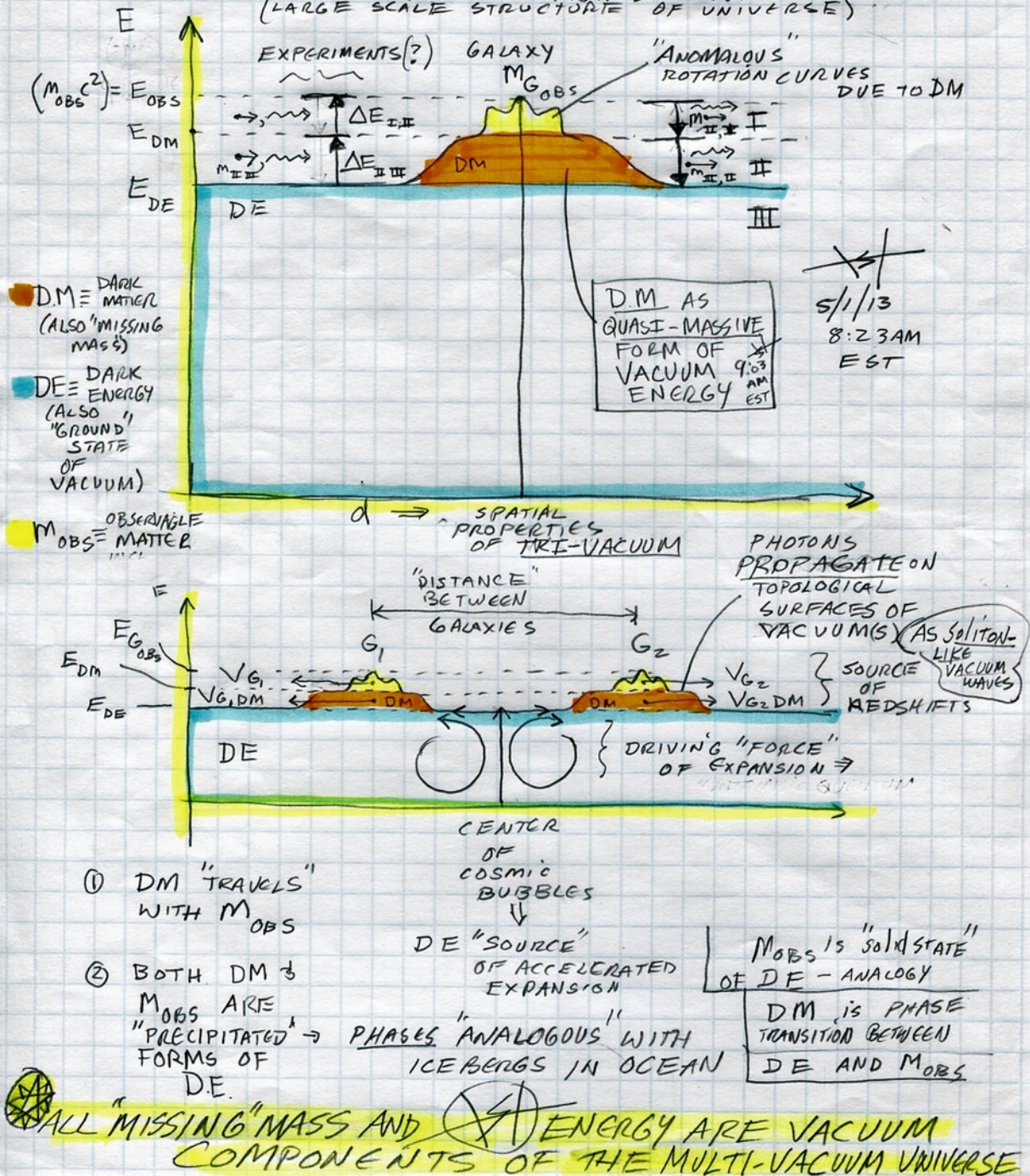
⇒ COSMIC PHASE TRANSITIONS OF "VACUUM"  
(LARGE SCALE STRUCTURE OF UNIVERSE)

FIGURE 2



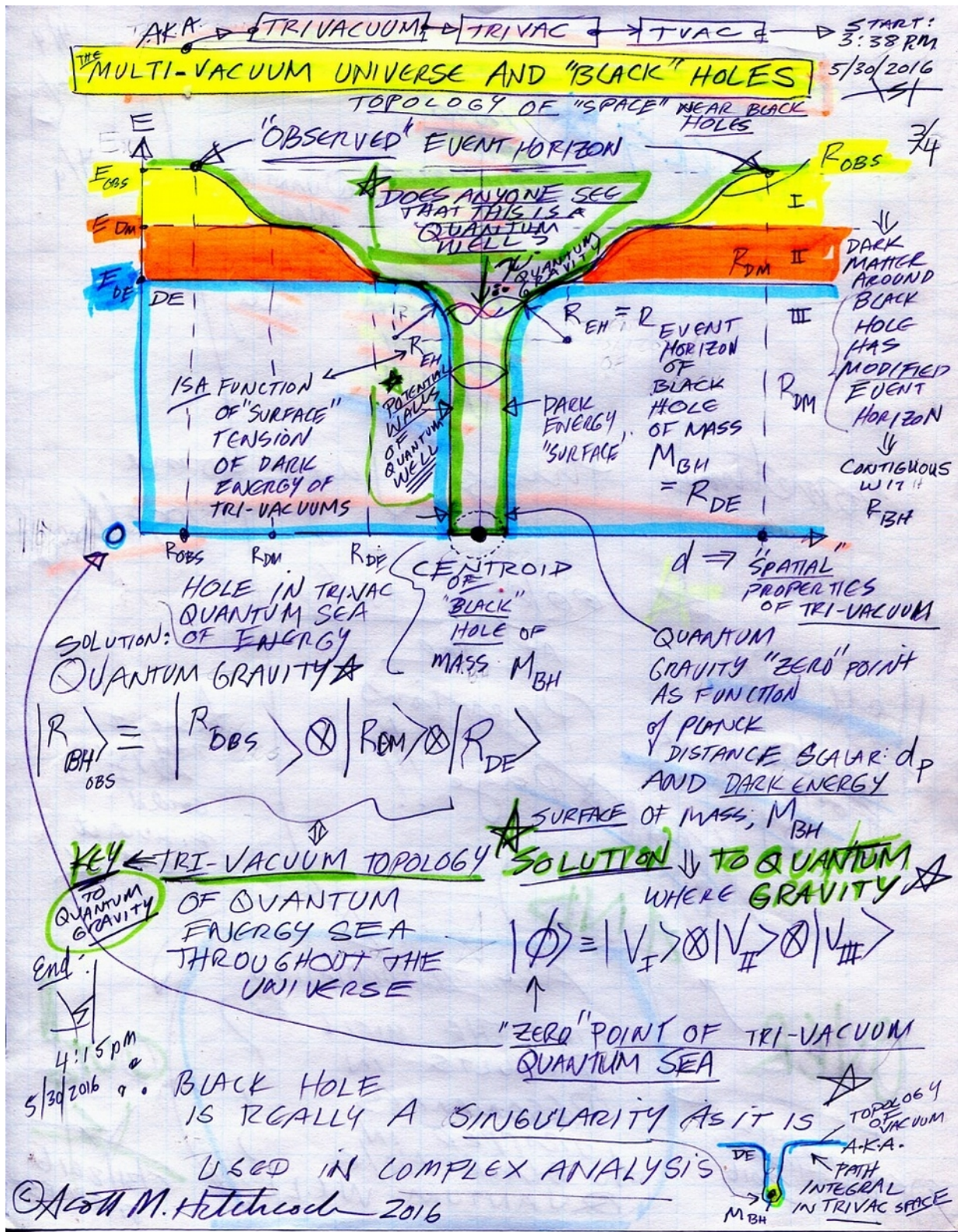


FIGURE 3



A hypothesis is presented that dark matter [missing mass] and dark energy [missing energy or 'quintessence' etc.] are not something in addition to, or superimposed on, the vacuum. The vacuum being referenced here is the vacuum we make with our vacuum pumps and is essentially equivalent to the vacuum of space near matter. This vacuum is a kind of 'local' vacuum that along with observable matter forms the visible universe. It is proposed that the local vacuum is in fact a composite of a dark energy vacuum base and a transitional dark matter vacuum. The local vacuum has a contribution to these other two components due to the interaction of matter with the quantum field generated by the other vacuums. This means that the local vacuum is really a composite of three states including a cosmic 63.8% dark energy vacuum, a 26.8% dark matter vacuum attached to observable matter, and the vacuum contribution supporting the 4.9% remaining local matter + vacuum interactive system that constitutes the observable universe. *note that all of these vacuums represent a quantum sea of energy distributed throughout the universe but with varying vacuum energy densities.*

Recent evidence [ref] indicates that the universe is accelerating its expansion and that dark or missing matter and energy are somehow driving this. The conventional approach to this problem is to look for particles or fields that are already a part of the vacuum of space but are merely invisible due to our inability to detect them. It is proposed that the expansion of the universe is due to the unique properties of a complex vacuum previously assumed to be as single state throughout the universe. In other words dark matter is really a phase of the dark energy vacuum [the primary building block of the local vacuum]. If the vacuum is really a composite of dark energy and dark matter interacting with the observable universe, then searches for special particles or fields in the observable universe might end in null results. If we assume that dark matter component of the vacuum acts like matter then it can cause gravitational effects such as bending of light and non-Newtonian rotation curves for galaxies. The difference here is that the dark matter is really more like dense vacuum gravitationally bound to and traveling with observable matter. It is a property of the vacuum as opposed to being a hidden matter component of the observable universe.

This is analogous to an iceberg in the ocean. In this case the vacuum due to the dark energy is the ocean, the dark matter is the iceberg below the observable surface of the ocean and the iceberg and the space surrounding it above the surface of the energy ocean that constitutes all observable matter and energy. If this is so, then looking for a 'smoking gun' particle or particles to compose the dark matter around galaxies may yield null results.

It may be possible to penetrate into the dark matter and dark energy components of the local mass-modified vacuum by 'screening' the quantum effects of observable matter interacting with these vacuums.

For example screening the local matter-vacuum effect occurs in the situation of the Casimir effect. By effectively filtering out the quantum vacuum effects [energy modes] between two massive parallel plates with narrow separation you could think of this as cancelling the local component of the vacuum that is created only by the interaction of matter with the primary dark matter and energy vacuum components. This would leave the remaining vacuum as only that due to the dark matter and dark energy vacuum components. The dark energy vacuum component by itself without the dark matter vacuum component should occur inside the various cosmic bubbles driving the expansion of the universe inside the strings, filaments, and networks of galaxies lying along the condensation zones between bubbles.

These vacuum components might be accessible. One might be able to probe these with high energy particles that are modified [scattering, decay modes etc.] specifically by a pure dark energy vacuum in ways that are different from their interactions with a local vacuum.

Black holes may also represent a tool to look for and identify the dark energy and dark matter components of the vacuum.

One curious issue that arises from this set of hypotheses is that light traversing the cosmic bubbles between galaxy filaments should be red-shifted due to the lower background energy of the dark energy vacuum. This would imply that some part if not all of the redshifts used to map the 'accelerating' universe could be due to photon interactions with the vacuum – photons in this situation would act as solitons propagating in the 'surface' energy of the 'pure' or lowest dark energy state vacuum of the cosmic bubbles and 'refracting' at the dark matter vacuum and local vacuum transitions around matter. This all depends on how photons or other particles interact with the Casimir vacuum [possible dark matter and dark energy vacuums together] between massive parallel plates [other geometries are useful to look at as well – sphere to sphere, sphere to plane, etc.] separated by very small distances.

Some of this has been looked at long ago in other theories such as 'tired' light and the steady state universe but always assuming a single state of the vacuum throughout the universe.

In summary, dark energy and dark matter are right in front of us if we see them as manifestations of a more complex vacuum than previously imagined.

**If you are looking for the missing mass and energy locally, look no further than your body which is 99.9999999% Empty Space or the vacuum and its components described here.**

**The nature of the vacuum that constitutes the 'empty' space in our bodies is modified by the matter that is present in the biological structures and systems that maintain life. These chemical systems at the microscopic and particle level interact with the "empty space" or vacuum to maintain metabolic processes necessary for life.**

## **Bibliography:**

- 1) The Big Bang is the result of many Mini-Bangs leading to the Prediction of Remnants such as Black Holes in the center of Cosmic Voids or Bubbles in the MULTI-VACUUM States of the Universe. Missing mass and energy is found by in the various states of the vacuum in which most of the energy of the universe resides. The Planck length is shown to be a fundamental aspect of the vacuum and limits the properties of Black Holes. A Casimir effect detector is proposed to verify the multi-vacuum properties.  
[https://www.researchgate.net/publication/341084552\\_The\\_Big\\_Bang\\_is\\_the\\_result\\_of\\_many\\_Mini-Bangs\\_leading\\_to\\_the\\_Prediction\\_of\\_Remnants\\_such\\_as\\_Black\\_Holes\\_in\\_the\\_center\\_of\\_Cosmic\\_Voids\\_or\\_Bubbles\\_in\\_the\\_MULTI-VACUUM\\_States\\_of\\_the\\_Universe\\_Missing\\_mass](https://www.researchgate.net/publication/341084552_The_Big_Bang_is_the_result_of_many_Mini-Bangs_leading_to_the_Prediction_of_Remnants_such_as_Black_Holes_in_the_center_of_Cosmic_Voids_or_Bubbles_in_the_MULTI-VACUUM_States_of_the_Universe_Missing_mass)